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(71) Applicant
Wen-Guang LI
No 11 Alley 100, Lane 61, Nei-Hu Rd, Sec 1,
Taipei, Taiwan.

(72) Inventor
Wen-Guang LI

(74) Agent and/or Address for Service
Britter and Co
9 Alder Close, Baldock, Hertfordshire, SG7 6HN

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B8M
Selected US specifications from IPC sub-class
B65H

(54) Rewindable hose reel

(57) A rewindable hose reel assembly comprises a feeder pipe (20, 21, 23) with an associated bearing upon which is rotatably mounted a hose reel, a transmission (25, 26, 27) comprising a power motor and a clutch which, when the motor is being power driven, is arranged to bring the latter into driving engagement with the rotatable hose reel, such that the reel is rotated in synchronism with the motor to wind a hose on to the reel, and which, when rotation of the reels is arrested and power to the motor is switched off, as a consequence of the hose having been wound on to the reel, is also arranged to bring the motor out of driving engagement with the reel, a switch which, when the hose has been wound on to the reel, is operable to switch off power to the motor, and a hose layering device (31, 32, 34, 35) arranged to reciprocate axially of the reel during rotation thereof, to cause hose being wound on to the reel to be evenly layered thereon.

FIG. 3

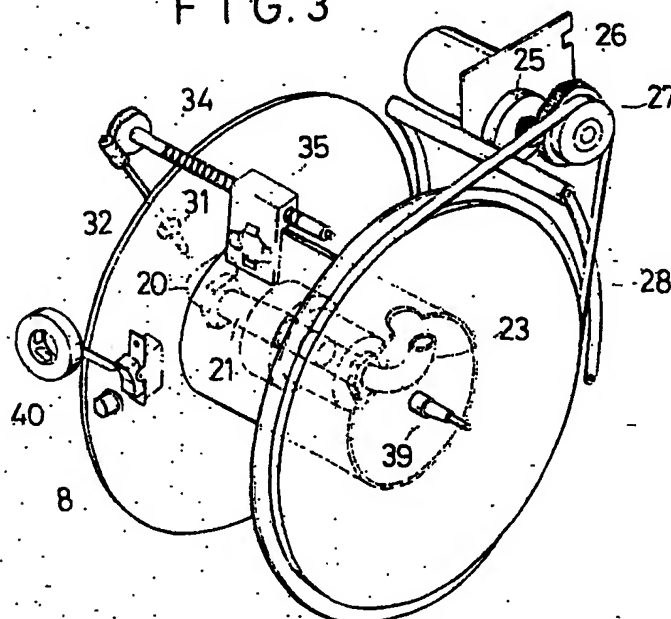


FIG. 1

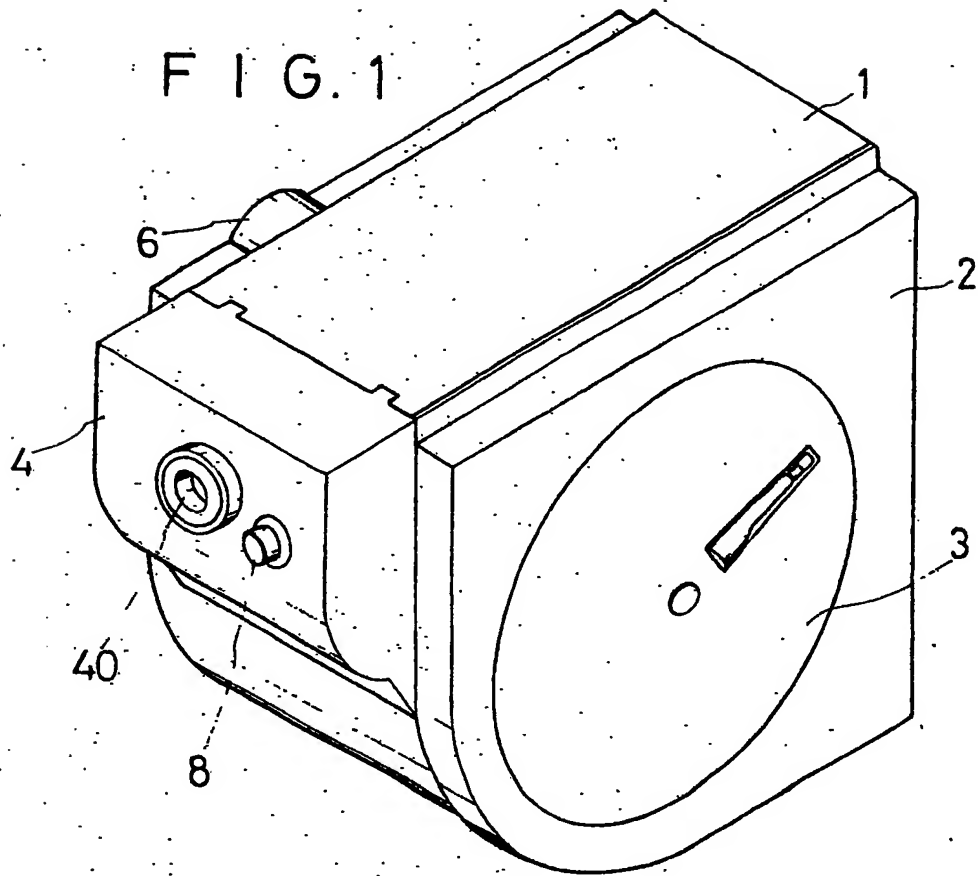


FIG. 2

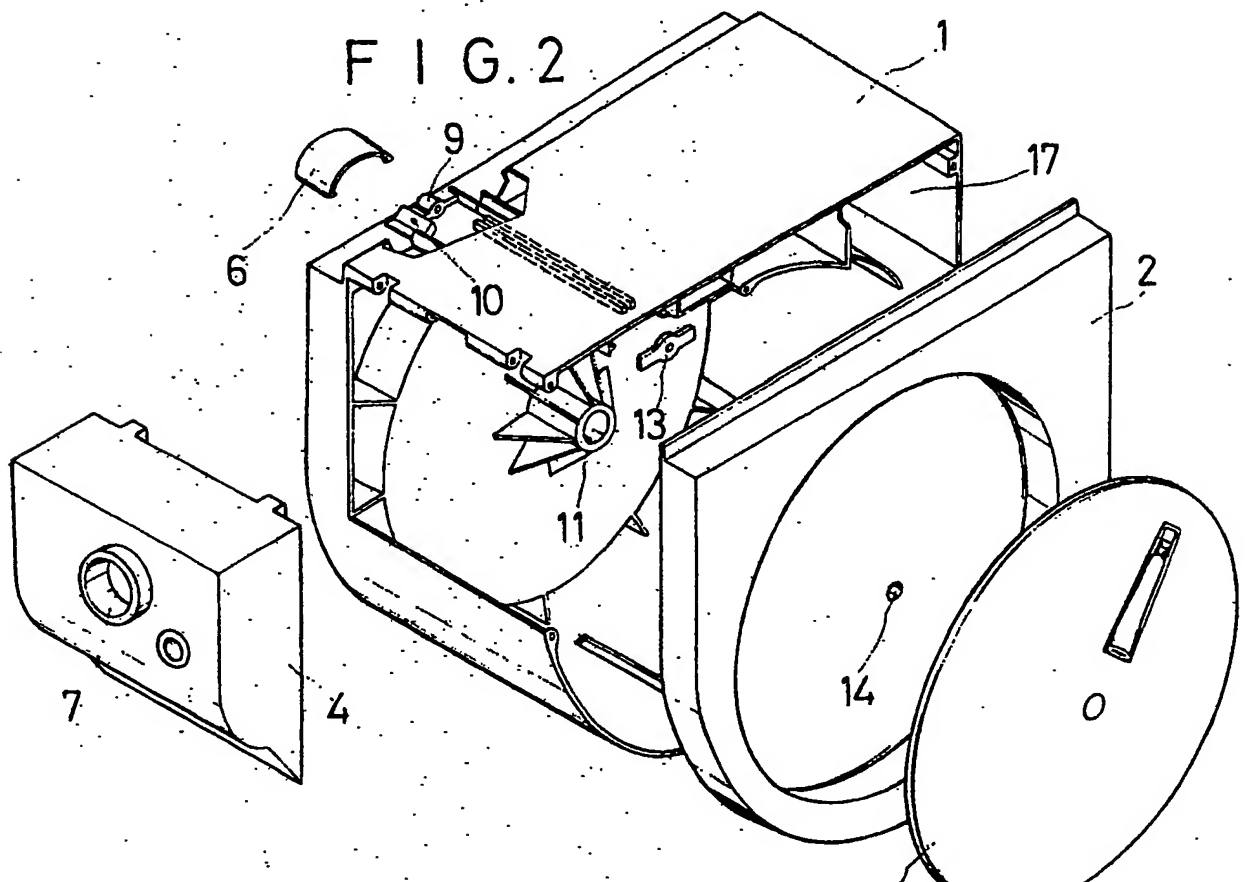


FIG. 3

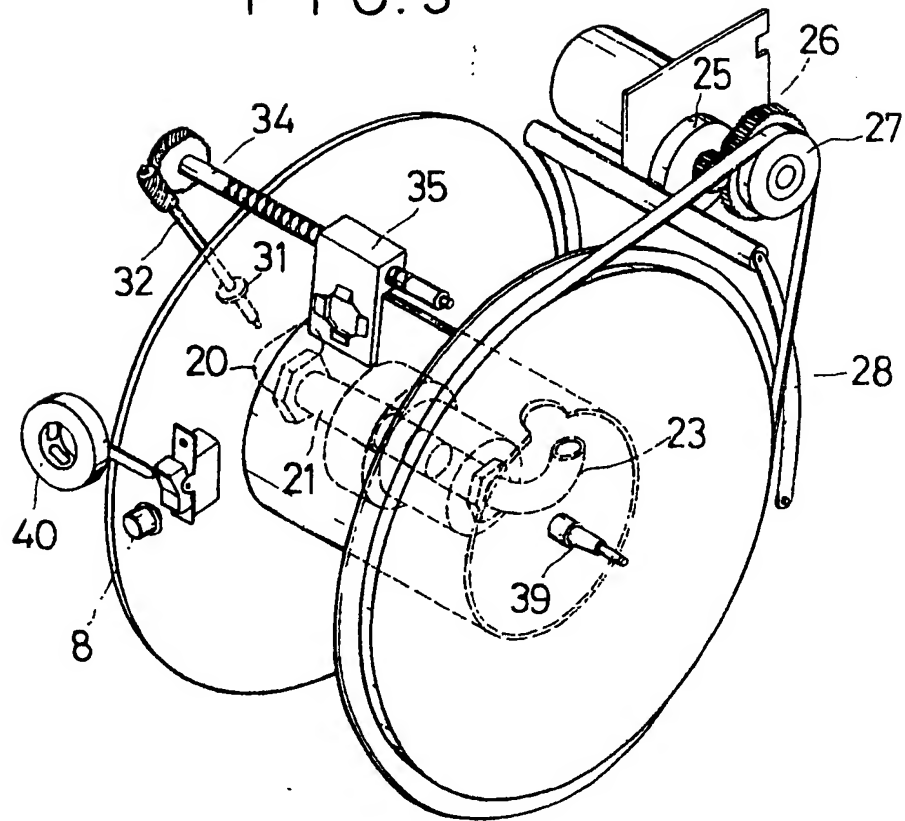


FIG. 4

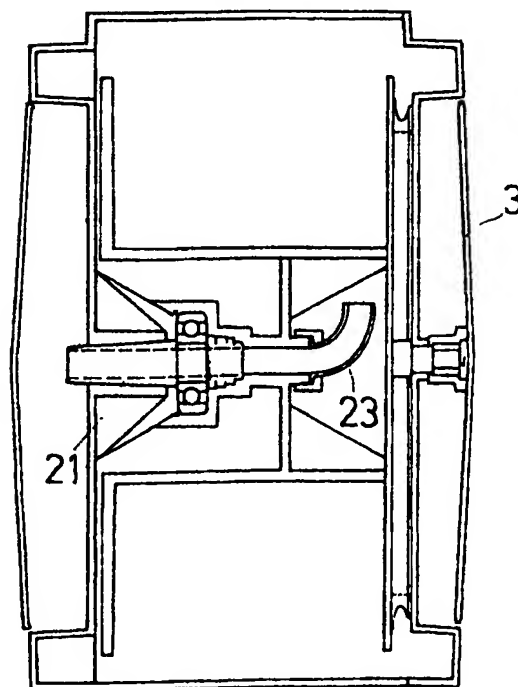


FIG. 5 2199304

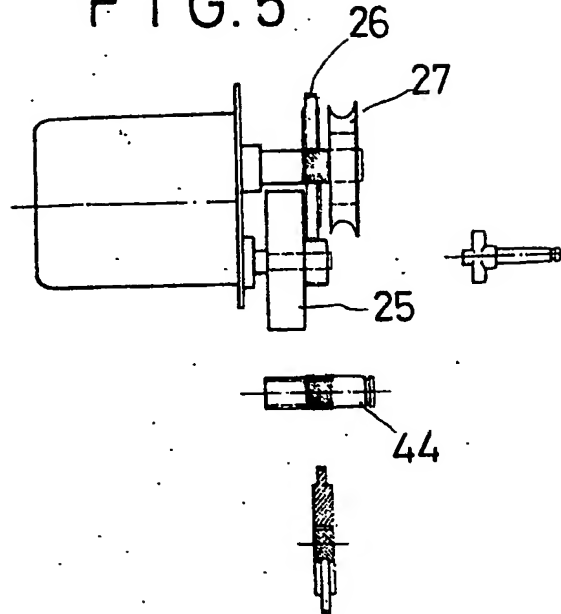


FIG. 6

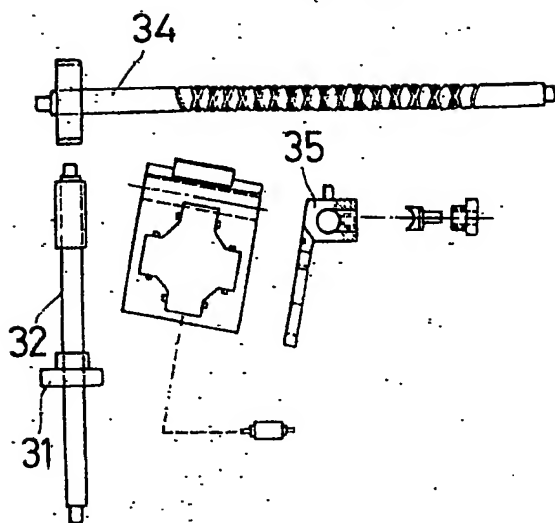
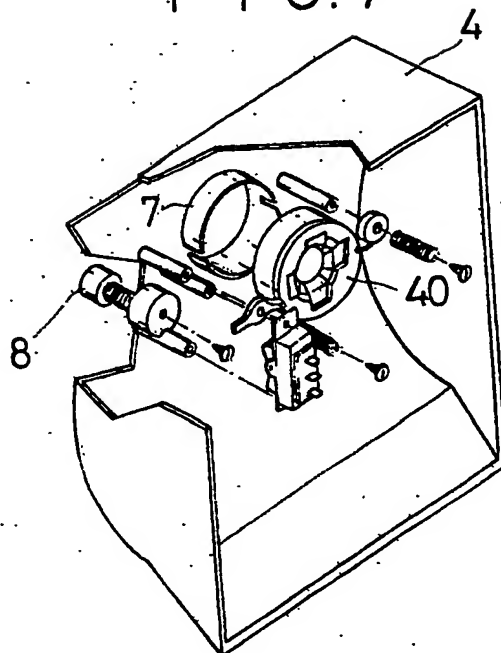


FIG. 7



REWINDABLE HOSE REEL

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DESCRIPTION

5 This invention relates to a rewindable hose reel for not only domestic purposes, such as, gardening and car cleaning, but also other applications.

10 Conventional household water hoses often cause a mess when they are dragged along the ground or other surface, with water dripping from them. Therefore, an automatically rewindable hose reel would be welcomed by all, its functions also including floor washing and home appliance cleaning, as well as fire fighting in
15 certain circumstances.

 An object of the invention is to eliminate, or at least substantially reduce the disadvantages associated with conventional water hose reels and to offer
20 a hose reel which can be rewound automatically after use of its associated hose, so that the hose does not become knotted and the local environment, in which the hose reel is used, can be kept tidy and clean.

25 Accordingly, the present invention provides a rewindable hose reel assembly comprising:

 (a) a feeder pipe with an associated bearing upon which is rotatably mounted a hose reel;
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 (b) a transmission comprising a power motor and a clutch which, when the motor is being power driven, is arranged to bring the latter into driving engagement with the rotatable hose reel, such that the reel is
35 rotated in synchronism with the motor to wind a hose on to the reel, and which, when rotation of the reel

is arrested and power to the motor is switched off, as a consequence of the hose having been wound on to the reel, is also arranged to bring the motor out of driving engagement with the reel;

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(c) a switch which, when the hose has been wound on to the reel, is operable to switch off power to the motor; and

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(d) a hose layering device arranged to reciprocate axially of the reel during rotation thereof, to cause hose being wound on to the reel to be evenly layered thereon.

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Preferably, the feeder pipe comprises an upstream section in the form of an extension pipe connectable to a source of water or other fluid to be fed into an associated hose, a mid-stream section in the form of an axial shaft of, say, stainless steel, with a central passage and an outer bearing upon which is rotatably mounted the hose reel, and a downstream section for connection to a hose associated with the reel. The mid-stream section may be provided with sealing rings for preventing leakage of water when the reel is being rotated. Also, the mid-stream section of the pipe may have a tapered end portion for engaging with a correspondingly tapered part of a housing containing the reel.

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In a preferred embodiment, the motor is electrically powered, with the clutch preferably comprising a sleeve mounted on the output shaft of the motor and a pulley freely rotatably mounted on the free end thereof. A wheel is threadedly mounted upon the middle section of the sleeve and, when the motor is being power driven, engages the pulley in driving engagement therewith. In turn, the pulley is connected drivingly to the hose

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reel, preferably by means of a drive belt engaging around the periphery of an end flange of the reel. In this manner, the reel is rotated in synchronism with the motor, to wind the hose on to the reel.

5 The switch, preferably a two-way limit switch, may be located at or adjacent an inlet/outlet for the hose, such that, when the hose has been rewound on to the reel as a consequence of the driven rotation thereof, 10 the switch is operated to switch off power to the motor and to short circuit the same causing braking thereof. In this manner, the wheel on the sleeve of the motor shaft, which also rotates a flywheel during the winding operation, is disengaged from the pulley, due to the 15 inertia of the flywheel, and is consequentially retracted from the pulley. As the latter is freely rotatable upon the sleeve, the motor is disengaged from driving relationship with the reel.

20 In the same manner of disengagement, the reel may be rotated manually without the motor being rotated, because the "free-wheeling" pulley on the motor shaft sleeve is not in engagement with the wheel and, hence, is not in driving engagement with the motor.

25 The hose layering device preferably comprises a two-way drive rod with a continuous thread, which extends axially across the reel and on which is reciprocally movable a hose guide, advantageously comprising 30 the hose inlet/outlet. This latter component may consist of an apertured element mounted in a wall of a housing for the reel, with rollers located around the periphery of the element's aperture, for reducing friction when the hose is wound therethrough. The switch for controlling 35 power to the motor may be positioned adjacent the hose inlet/outlet, such that, when the hose is wound on to

the reel, a fitting, such as, a nozzle or associated connector, at the free end of the hose can engage the apertured element, on complete rewinding of the hose, to actuate the switch and cut off power to the motor and cause braking thereof. A manually-operable switch button may be used to commence driving of the motor, to wind hose on to the reel.

Advantageously, the reel and other components of the assembly are located within a housing which is reinforced to withstand the load upon the reel and its associated bearings, during rewinding and unwinding of the hose.

In order that the invention may be more fully understood, a preferred embodiment in accordance therewith will now be described by way of example and with reference to the accompanying drawings in which:

Fig. 1 is a perspective view of a rewindable hose reel unit;

Fig. 2 is an exploded view of the unit shown in Fig. 1;

Fig. 3 is a perspective view of the interior of the unit shown in Figs. 1 and 2;

Fig. 4 is an elevational view of the interior of the unit;

Fig. 5 is an exploded view of a clutch used in the unit shown in Figs. 1 to 4;

Fig. 6 is an exploded view of a hose layering device used in the unit shown in Figs. 1 to 4; and

Fig. 7 is an exploded view, in perspective, of a hose inlet/outlet of the unit.

A rewindable hose reel unit, in accordance with the invention and as shown in the accompanying drawings, comprises the following features, namely: a water feed assembly; a transmission with a clutch; a hose layering device; and a housing, which are described hereinbelow.

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Water Feed Assembly - This assembly is shown in Figs. 2 to 4 and comprises three sections, the first being an upstream section in the form of an extension pipe 20 connectable to a source of water. The second section is a mid-stream one in the form of a stainless steel, tubular shaft 21 which is mounted in a central shaft hole 11 on side wall of the unit housing. The axially bored shaft 21 is tapered to facilitate its entry into the hole 11 where it is force fitted during assembly, and has bearing means for rotatably supporting the core of a hose reel, with associated seals for preventing water leakage during use of the unit, particularly when the hose reel is being rotated. The third, downstream section of the water feed assembly is a pipe 23 connected at one end to the shaft 21 and at its other end, to a hose wound on to the reel core.

Transmission - A power motor, as shown in Figs. 3 and 5, has an output shaft upon which is received a sleeve 44 with a three gear coupling at its mid-portion. When power is supplied to the motor by actuating a push button 8 of an associated double-pole switch mounted adjacent a hose inlet/outlet 40, to wind the hose on to the reel, a wheel 26, which is also mounted movably upon the sleeve 44, is urged into driving engagement with a pulley 27 mounted for normal free rotation upon

the free end of the sleeve 44. At the same time, the wheel 26 drives a flywheel 25. A drive belt around the pulley 27 and a flange of the reel, as shown in Fig. 3, rotates the latter, to wind the hose on to the reel core. When the hose is wound substantially fully on to the core, the free end of the hose, usually in the form of a nozzle fitting, engages with the spring loaded, hose inlet/outlet 40 whose consequential limited movement inwardly of the unit housing causes the adjacent double pole switch to be actuated to disconnect power to the motor, whilst also causing short-circuit braking thereof. With the reel no longer being able to rotate and the motor under short circuit braking, the wheel is subjected to the angular inertia of the still-rotating flywheel 25 and, as a consequence, disengages and retracts from the pulley 27. In this manner, the stationary hose reel is disengaged from the braking motor, as the pulley is freely rotatably mounted upon the motor output shaft sleeve 44. With this clutch-type arrangement between the motor and hose reel, rotation of the reel will not rotate the motor when the hose is unwound manually from the unit's reel core. Similarly, the same applies when the hose is rewound manually.

The inner periphery of the hose inlet/outlet 40 is fitted with rollers to reduce friction, when the hose is being unwound or rewound, and it is also spring-loaded to reduce the impact of the free hose end, or any associated fitting thereon, therewith during motor powered winding of the hose.

Hose Layering Device - In order to accommodate the wound hose within the limited space available within the unit, the hose layering device is provided. This device, as shown in Figs. 3 and 6, comprises a worm 32 which is mounted on the side of the reel remote from

the belt driven flang and which has a drive wheel 31 engaging the corresponding reel flange. The worm 32 drives a continuously-threaded bolt 34 which extends axially across the reel, spaced from the core thereof. Threadedly mounted upon the bolt 34 is an apertured hose guide 35 which, on rotation of the bolt 34 by the worm 32 and drive wheel 31 during rotation of the reel, reciprocates in a shuttle movement axially across the reel core, to layer the hose evenly thereon. Associated with the layering device is a press bar 28 which is urged against the outer wound hose layer on the reel core, to prevent the hose from loosening.

Housing - As shown in Figs. 1, 2 and 4, the housing of the unit comprises five basic parts, namely, a generally four sided, main part 1, a front wall 4, a circularly-recessed side wall 2, a rotatable cover 3 received in the circular recess of the side wall 2, and a small shroud 6. As shown in Fig. 3, the reel core has a bearing shaft 39 which extends through a hole 14 at the centre of the recess in the wall 2 and which is received within a corresponding, central hole in the cover 3. A retractable handle is provided in the outer face of the cover 3, for manually rewinding the hose. The bearing shaft 39 and cover 3 arrangement is such that, when the handle is used to rotate the cover 3 in a direction that would otherwise unwind the hose, the cover rotates freely and does not rotate the reel in that unwinding direction, thus avoiding messy unwinding of the hose, should the retractable handle be rotated in that direction inadvertantly.

In Fig. 2 are shown installation holes 9, 13 for receiving respective ends of the bolt 34, the hole 10 being that for receiving the worm 32. The shroud 6 covers these holes 9, 13 and 10. The split collar

7, as shown in Figs. 2 and 7, is used for mounting the
hose inlet/outlet 40 in the corresponding aperture in
the front wall 4 and the space 17, as shown in Fig.
2, receives the motor and associated components, such
5 as, at least some of the components of the clutch.

It is to be appreciated that, although the
above-described embodiment is directed to a rewindable
hose reel unit, other embodiments of the invention may
10 be used with pneumatic or vacuum hoses.

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CLAIMS

1. A rewindable hose reel assembly comprising:

5 (a) a feeder pipe with an associated bearing upon which is rotatably mounted a hose reel;

(b) a transmission comprising a power motor and a clutch which, when the motor is being power
10 driven, is arranged to bring the latter into driving engagement with the rotatable hose reel, such that the reel is rotated in synchronism with the motor to wind a hose on to the reel, and which, when rotation of the reel is arrested and power to the motor is switched
15 off as a consequence thereof, is arranged to bring the motor out of driving engagement with the reel;

(c) a switch which, when the hose has been wound on to the reel, is operable to switch off
20 power to the motor; and

(d) a hose layering device arranged to reciprocate axially of the reel during rotation thereof, to cause hose being wound on to the reel to be evenly
25 layered thereon.

2. An assembly according to claim 1, wherein the feeder pipe comprises an upstream section connectable to a source of fluid to be fed into an associated hose,
30 a mid-stream section with associated bearing means upon which is rotatably mounted the hose reel, and a downstream section for connection to an associated hose.

3. An assembly according to claim 2, wherein
35 seals are provided to prevent leakage from the feeder pipe.

4. An assembly according to claim 2 or 3, wherein the mid-stream section of the feeder pipe is of stainless steel and has a tapered end, to facilitate fitment into a corresponding aperture in a part of an associated housing of the unit.

5. An assembly according to any preceding claim, wherein the clutch comprises a sleeve mounted on the output shaft of the motor, a pulley rotatably mounted on the free end of the sleeve, a wheel mounted on the sleeve and flywheel drivable by the wheel, the arrangement being such that, when the motor is power driven, the wheel drives the flywheel and engages the pulley in driving relationship therewith, the pulley being connected drivingly to the hose reel, whereby the reel is rotated in synchronism with the motor, and such that, when rewinding of the hose is arrested and, as a consequence, power to the motor is disconnected, the wheel disengages from the pulley, due to the inertia of the rotating flywheel, whereby the motor is disengaged from driving relationship with the reel.

6. An assembly according to any preceding claim, wherein the motor is an electric motor.

7. An assembly according to any preceding claim, wherein the clutch is arranged to permit the hose to be wound manually on to the reel, with the motor out of driving engagement with the reel.

8. An assembly according to any preceding claim, wherein the motor can be brought into driving engagement with the reel via a belt drive connected between the clutch and reel.

9. An assembly according to any preceding

of the hose on to the reel and to switch off power to the motor on completion of such hose winding.

10. An assembly according to claim 9, wherein
5 the switch is actuatable, on completion of said hose rewinding, to switch off power to the motor as a consequence of the free end of the hose engaging a hose inlet/outlet provided in part of a housing of the assembly.

10 11. An assembly according to claim 9 or 10, wherein the switch is a double-pole switch which is arranged to cause short-circuit braking of the motor when power is disconnected therefrom.

15 12. An assembly according to any preceding claim including a hose layering device arranged to reciprocate a hose guide axially of the reel, to cause hose being wound thereonto to be layered evenly thereon.

20 13. An assembly according to claim 12, wherein the hose layering device comprises means drivable by the reel and drivably connected to a threaded rod or bolt extending axially across the reel, the hose guide being threadedly mounted upon the rod or bolt.

25 14. An assembly according to claim 13, wherein said drivable means comprises a drive wheel engaging the reel and arranged to rotate a worm which, in turn, rotates the threaded rod or bolt, to reciprocate the
30 hose guide axially of the reel.

15. An assembly according to any preceding claim including means for engaging hose wound on to the reel, to prevent unwinding thereof.

16. An assembly according to any preceding claim including means for winding hose manually on to the reel, said manual winding means being arranged to idle when wound in an otherwise hose unwinding direction, to prevent inadvertant manual unwiding of the hose from the reel.

17. An assembly according to claim 16, wherein said manual winding means has a retractable handle.

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18. An assembly according to any preceding claim including a housing in which the other components of the assembly are mounted.

19. A rewindable hose reel unit substantially as hereinbefore described with reference to the accompanying drawings.

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